SANDPOINT HATCHERY
ANNUAL REPORT

July 1, 1990 to December 31, 1990

Prepared by

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INTRODUCTION

Sandpoint Hatchery, Idaho's third oldest fish production facility, was built on the south shore of the Pend Oreille River in 1909. Sandpoint sportsmen contributed $900 for the purchase of the 20-acre site. The hatchery was closed following the 1984-85 production year because of poor cost effectiveness of the station. Restoration efforts by local sportsmen prompted the hatchery reopening during the 1990 production year. The hatchery will operate as a specialty fish production facility, with an emphasis on public involvement and improving public relations. The primary duties include developing culture techniques for bull trout, managing the north Idaho net pen program, managing a small scale hatchery, providing an active liaison for north Idaho sportsmen, and operating or assisting in other north Idaho egg take programs (Figure 1). Fish species will include bull trout, westslope cutthroat, late kokanee, and fall chinook.

WATER SUPPLY

The hatchery water right is 4 cfs from Murphy Springs 1, 2, 3, and 4 with a collection reservoir and pipeline through private property. The Idaho Department of Fish and Game (IDFG) has been deeded the springs, but not the land. The IDFG has an agreement to provide a 2-inch domestic line in exchange for an easement (20 feet wide) from the springs to the hatchery. The IDFG has vacated the rights of Spring 2 in the amount of 300 gpm for a sewer treatment plant.

The useable hatchery water flow is 500 to 700 gpm of 44 to 46°F water from Spring number 3. Springs 1 and 4 have not been fully developed.

REARING FACILITIES

The hatchery rearing facilities include eight 8-tray heath incubators, 18 cement vats (13 ft x 2.5 ft x 3 ft) and 2 (100 ft x 5 ft x 2 ft) reuse raceways. The buildings consists of a hatchery/shop/office complex, one storage shed, garage/crew quarters, and a residence.

HATCHERY IMPROVEMENTS

John Campbell organized two local sportsmen groups; Trout Unlimited and Lake Pend Oreille Idaho Club, to undertake the hatchery restoration project. The improvements completed before the July reopening included:

Hatchery:

1. Sandblasted and painted the inside vats.
2. Interior and exterior paint.

Sandpoint Hatchery
Time Allocations, 1990

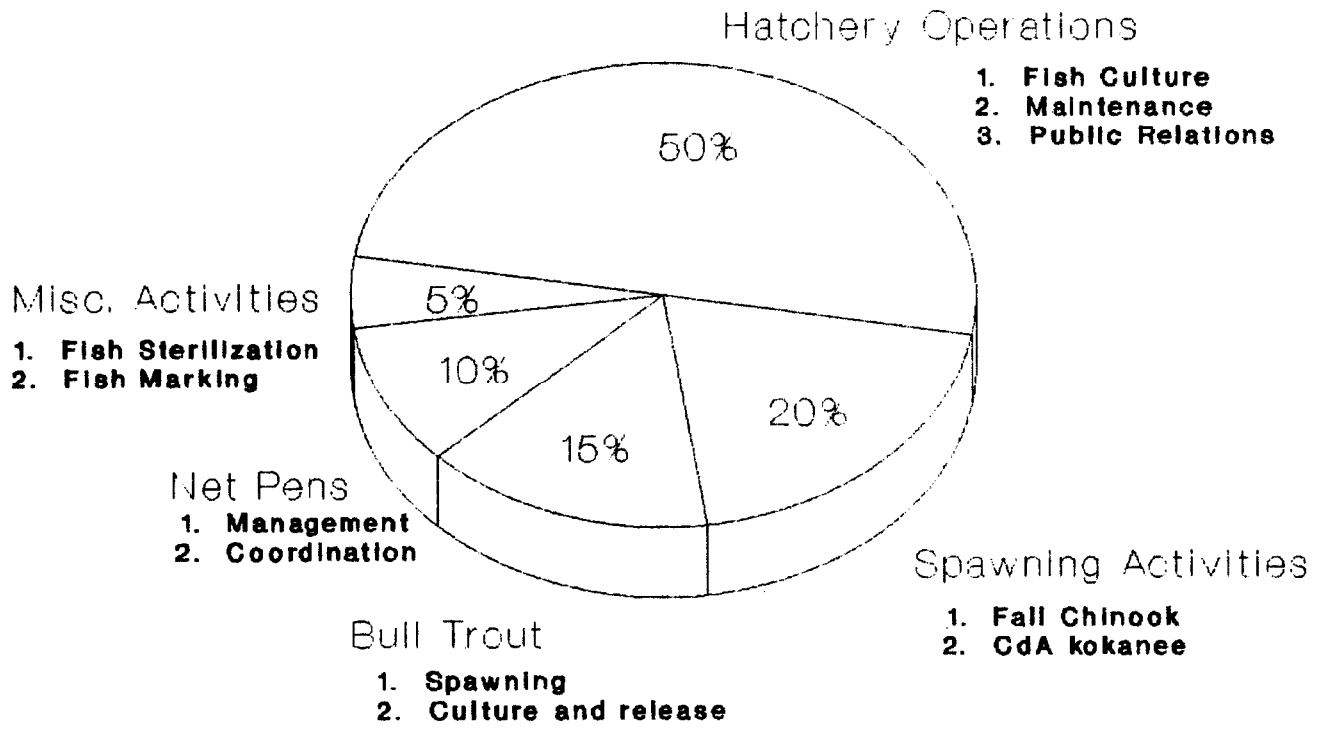

Fig. 1. Sandpoint Time allocations 1990.

3. Insulated shop and office walls.
4. Installed paneling in shop and office.
5. Trimmed windows and doors in shop and office.
6. Textured ceiling in shop and office.
7. Constructed entry way to hatchery.
8. Wired shop and office to code.
9. Installed new shower, pressure, and hot water tanks.

Residence:

1. Textured living room, bedrooms, and hall.
2. Installed carpet in living room, hall, and bedrooms.
3. Installed kitchen cabinets.
4. Interior and exterior paint.

Other improvement made after the reopening include:

1. Replaced domestic line to residence.
2. Expanded parking area with connecting sidewalk.
3. Installed work bench and shelves in shop.
4. Installed electric heat in shop and office.
5. Re-plumbed hatch trays.

Future hatchery improvements will include a fishing dock, an information center, and a show/brood stock pond.

PUBLIC RELATIONS

Approximately 200 people attended the July reopening ceremonies. Guests included IDFG Commissioners, sportsmen group dignitaries, and local residents with a lunch provided by Trout Unlimited.

The hatchery had nearly 1,000 tourists during the first six months of operation, although road signs were not installed and the vacation season was nearly over. An information center will be a high priority for the visitors expected this year.

The Sandpoint facility was covered by most media outlets. The hatchery was featured on ABC, CBS, and NBC television affiliates from Spokane with the chinook and kokanee programs receiving TV coverage as well. The Sandpoint Daily Bee newspaper covered the reopening ceremonies and two of the net pen loadings. In addition, a local outdoor columnist, John Campbell, wrote many articles covering the hatchery and its fishery projects. The Spokane Review newspaper wrote articles covering the hatchery also. The Review covered the reopening with emphasis on the "hows" and "whys" of the hatchery restoration with **a** follow-up story in the fall. I made two appearances on the "Speak up North Idaho" radio talk show.

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The net pen program is a public relations cooperative project. The local sportsmen volunteer time and money and IDFG provides fish and professional consultation to rear cutthroat trout using net pens in Lake Pend Oreille.

PRODUCTION

Sandpoint Hatchery did not reach full production during the first months in operation. Sandpoint received 1,493 pounds of fish from Cabinet Gorge Hatchery and 22.5 pounds of fish from Grace Hatchery (Table 1).

A total of 2,112 pounds of feed produced 1,636 pounds of gain for a 1.29 conversion. Average feed cost per pound, including shipping, was $0.470 resulting in a feed cost per pound gained of $0.606. Total production cost (July 1 to December 31) minus capital outlay costs was $24,750 resulting in cost per pound of fish produced at $15.31 and $43.07 per thousand fish (Table 2).

Fish distributions were made by Cabinet Gorge and Clark Fork hatcheries.

Bull Trout

Background

Idaho's first experimental culture of bull trout was done with Clark Fork River stock in 1987 at Cabinet Gorge Hatchery with limited success. Survival from egg to release has ranged from 0o to 14% (Figure 2). Three major reasons for this high loss at Cabinet Gorge included:

1. mechanical failure
2. gamete infertility
3. sac-fry mortality

Gold Creek stock was included in the program in 1989 because of its good natural population (Maiolie, Idaho Department of Fish and Game, personal communication). Thirteen bull trout from this stock yielded an 85% egg eye-up. Three Clark Fork River females were crossed with three Gold Creek males and no embryos survived.

To protect the Gold Creek population, a maximum of ten females can be spawned for the hatchery program. This number should not significantly impact the wild population, yet will provide a reasonable level of genetic diversity. The number of bull trout spawned from Gold Creek will depend on the adults returning to the Clark Fork River, which are trapped in the Cabinet Gorge ladder. If 20 or more females can be spawned from the Clark Fork River, no females will be spawned from Gold Creek. If 15 females are spawned from the Clark Fork River, 5 can be spawned from Gold Fork, etc., with a 10 fish limit from Gold Creek.

Table 1. Fish transferred to Sandpoint Hatchery, 1990.

Date	Hatchery	Stock	Lenqth	No/lb	Weight	No.
7-18	Cabinet	89-Id-BT	3.79	61.3	55.5	3,400
7-19/20	Cabinet	89-Mon-C2	5.22	20.1	1346.0	27,100
7-26	Cabinet	90-Mon-C2	1.28	2877.0	8.7	25,000
7-27	Cabinet	90-Id-KL	2.11	410.0	48.2	19,700
9-17	Grace	90-Ut-LT	5.20	22.5	34.4	788
	Totals				1492.8	75,988

Table 2. All species production summary, Sandpoint 1990.

Stock	Status	Numbers	Lbs	Length	fish per lb	food fed	conv-ersion	feed cost/ lb	prod-uction cost	cost per lb	Cost/ fish eqq
89-Mon-C2	OH	13,900	1,600	6.8	9						
	R	12,045	963								
		25,945	2,563			1,440	1.18	0.456	2,342	0.91	0.09
90-Mon-C2	OH	21,340	74	2.14	288	139	2.13	0.781	2,342	31.65	0.11
90-IdSS-KL	OH	7,700	128	3.81	60						
	R*	13,800	230								
		21,500	358	3.81	60	486	1.56	0.456	2,342	18.30	0.30
90-Id-Bt	R	3,340	81	4.32	41	32	na	na	1,171	14.47	0.35
90-Ut-Lt	OH	750	53	6.50	15	15	2.09	0.456	586	11.04	0.78
91-Id-Fc	R	34,140	--		eyed-egg	--	--	--	4,508	--	0.13
91-Id-Bt	OH	54,500	--		sac-fry	--	--	--	5,621	--	0.10
91-IdCd-KL**	OH	407,305	--		sac-fry	--	--	--	3,337	--	0.008
net pens									2,500		
Totals	OH	505,495	1,855								
	R	63,325	1,274								
		568,820	3,129						24,750***	15.13	0.04

* kokanee lost on return transfer from Cabinet Gorge
** kokanee incubating at Cabinet, rearing at Sandpoint in 1991
*** production cost based on 6 months of production minus capital outlay

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Bull Trout Summary
Cabinet Gorge Hatchery, 1987-89.

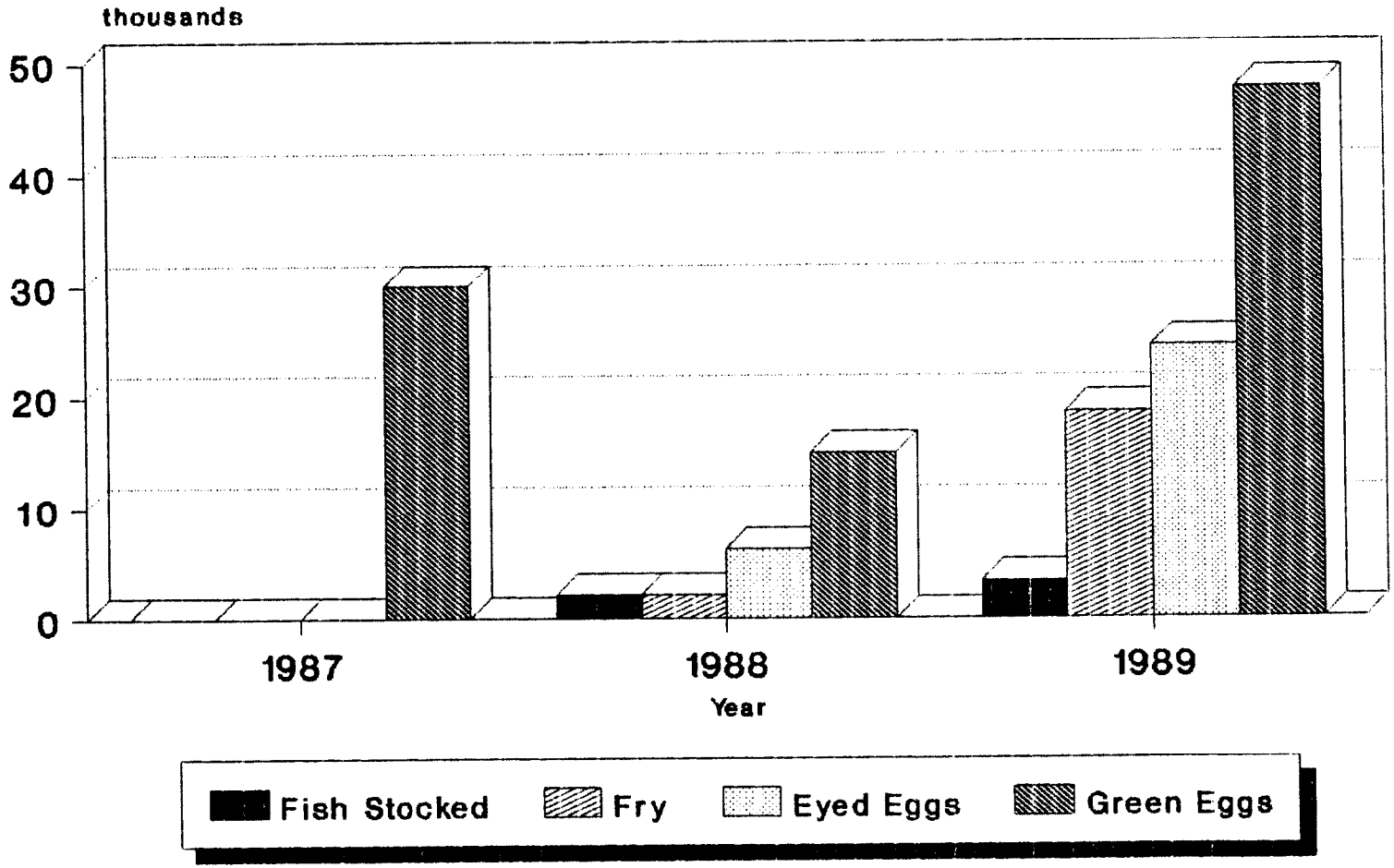

Fig. 2. Bull trout summary, CG 1987-89.

The bull trout program was transferred to the Sandpoint Hatchery in 1990 using the Clark Fork River and Gold Creek stocks.

Spawntaking

A total of 64,090 bull trout eggs were collected from the Clark Fork River and Gold Creek between September 27 and October 16. Eight females, out of the 10 trapped, were spawned from the Clark Fork River producing 30,220 green eggs, and 10 females spawned 33,870 eggs from Gold Creek (Table 3).

Five hundred eggs from two Clark Fork River females were fertilized with sperm from two Gold Creek males September 27, 1990. Normal embryos developed.

Six blood samples were drawn, two from Gold Creek fish and four from Clark Fork River fish for DNA analysis by, Ruth Phillips, University of Milwaukee-Wisconsin. She enumerated chromosomes from 50 embryos of Clark Fork River and Gold Creek stocks. All embryos were classified as bull trout with 78 chromosomes.

We measured all fish head, standard, and total lengths (Appendix 1 and 2). Only fish classified as bull trout using head:standard length ratios were spawned (Cavender 1978). All spawned fish had scale samples taken and sent to Dan Schill for aging. Ovarian samples were sent to Eagle Lab for disease diagnostic work.

Clark Fork River

Bull trout were noticed in the Clark Fork River on the spawning channel at Cabinet Gorge Hatchery during the first week in September. Bull trout may enter the ladder in early September, but the males enter ripe and the females enter green. Males normally dry up within days of capture in the Cabinet Gorge trap creating a fertility problem when spawning the fish. Therefore, the ladder was not started until September 25 in an attempt to capture ripe adults and alleviate the fertility problem. The late start up of the ladder proved to be successful with 77% eye-up. Eggs from the first three spawning days eyed around 90%, with eggs from the last day eyeing up at only 31% (Figure 3). The last spawning occurred October 16 with some indications of poor egg quality rather than poor sperm quality.

Gold Creek

Two trips, September 27 and October 15, were made to Gold Creek to spawn bull trout. This involves walking the creek and netting spawning pairs off redds. The captured fish were anaesthetized with MS-222 and hand striped with gametes stored on ice in Ziploc bags. The gametes are fertilized in ovarian

Table 3. Bull trout spawning summary, 1990.

Date	Site	Number Females	Number Males	Green Eggs
9-27-90	Cabinet	2	2	5,760
	Gold Cr.	2	5	5,910
9-29-90	Cabinet	3	5	11,040
10-3-90	Cabinet	1	2	6,120
10-15-90	Gold Cr.	8	8	27,960
10-16-90	Cabinet	2	2	7,300
Totals		18	24	64,090

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Bull Trout Egg Survival
Clark Fork River, 1990

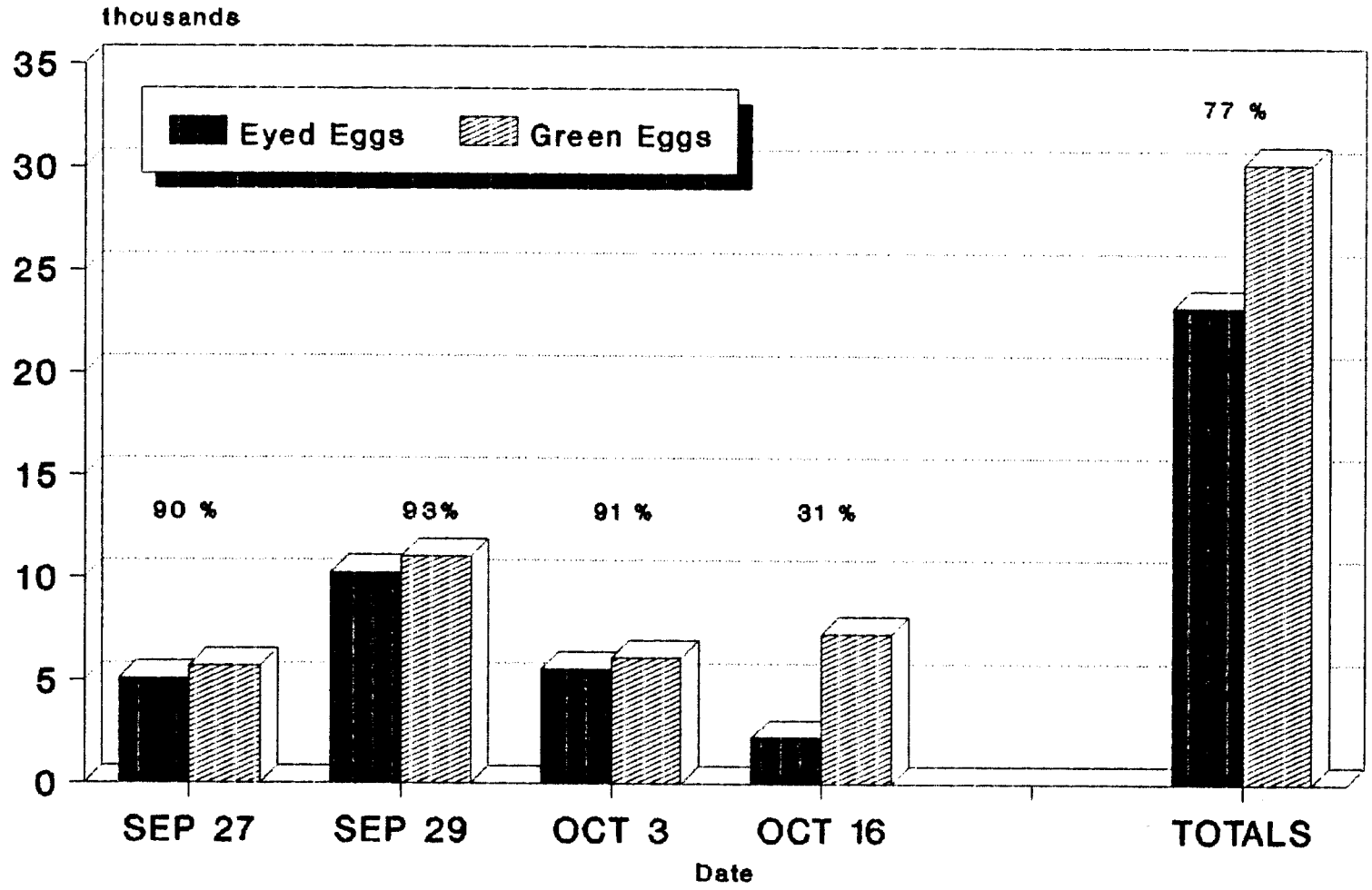

Fig. 3. Bull trout survival, CFR 1990.

fluid and water-hardened in 100 ppm Argentyne on station. These two egg takes resulted in 92.7% eye-up (Figure 4).

Other Spawning Activities

Chinook

A total of 164,000 green eggs were collected from 51 females in the Wolf Lodge Creek and Coeur d'Alene River traps from September 11 to September 24 (Table 4). Gametes were stored on ice, fertilized in ovarian fluid, and water-hardened in 100 ppm Argentyne.

Broodstock selection was based on size, with fish categorized as large adults when greater than 85 cm in length. Fifty percent of the spawn take was targeted for large adults crossed (1x1), and 50% from randomly selected adults crossed (2x2) or (3x3). Eggs were incubated in heath stacks as an individual "large" pair or multiple random pairs.

Sixty percent of the green eggs eyed resulted in 93,060 eggs, which 34,140 eggs were shipped to Mackay on November 5, 1990. The remaining embryos were destroyed. From the eggs shipped, 12,770 were selected from large adults and 18,570 eggs from random crosses. All fish spawned were represented in the shipment (Figure 5).

Ovarian, tissue, and head samples were sent to Eagle Lab for disease diagnostic work.

Kokanee

The Lake Merwin traps were in operation from November 9 to January 3, 1991. Both traps were initially installed in Beauty Bay. The 1-90 site was unavailable this season due to highway construction. One trap was moved December 13 into Wolf Lodge Bay, west of Blue Creek Bay, but was not effective in capturing fish. A late fall flood prevented us from moving the trap. Next season, we will set-up in late October to fully analyze the trapping site.

A total of 407,305 eggs were spawned from an estimated 1,390 females for an average of 293 eggs/female (Table 5). Spawning efficiency was measured at 94.8%.

On November 20, 50 length and tissue samples were taken by Dr. Ernie Brannon from the University of Idaho for a genetic data bank on kokanee/sockeye of the Pacific Northwest.

Disease samples were taken November 27 by Keith Johnson.

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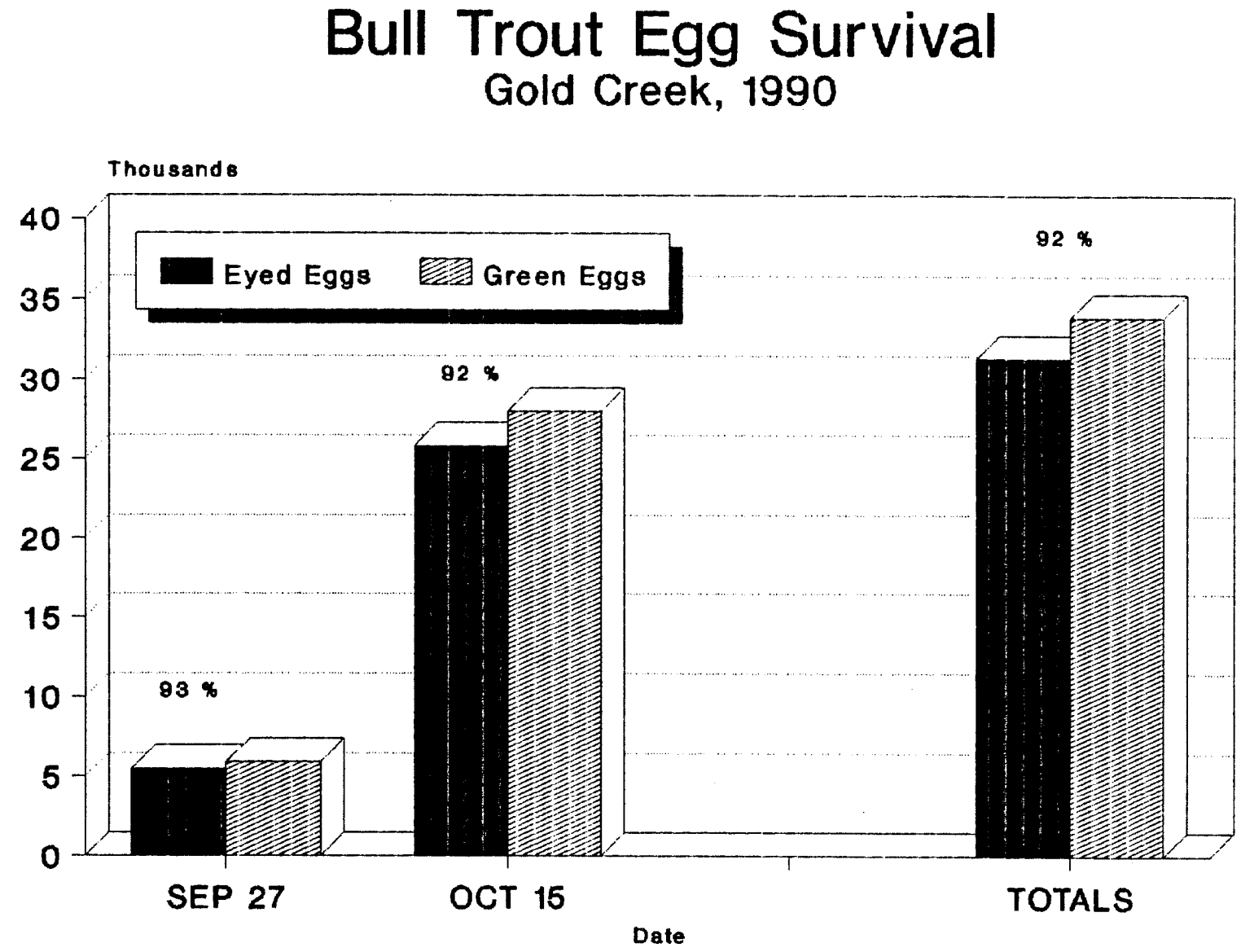

Fig. 4. Bull trout survival, GC 1990.

Table 4. Coeur d'Alene lake fall chinook spawning summary.

Date	Site	Number Females	Number Males	Green Eggs
9-11-90	WLC	1	1	4,800
	CdA	1	1	3,900
9-14-90	WLC	4	4	18,460
	CdA	1	3	na
9-17-90	WLC	8	4	27,530
	CdA	3	0	5,110
9-20-90	WLC	14	6	46,830
	CdA	0	0	
9-24-90	WLC	17	9	57,370
	CdA	2	0	
Totals		51	28	164,000

Fall Chinook Spawning Operation
Wolf Lodge and Coeur d'Alene sites

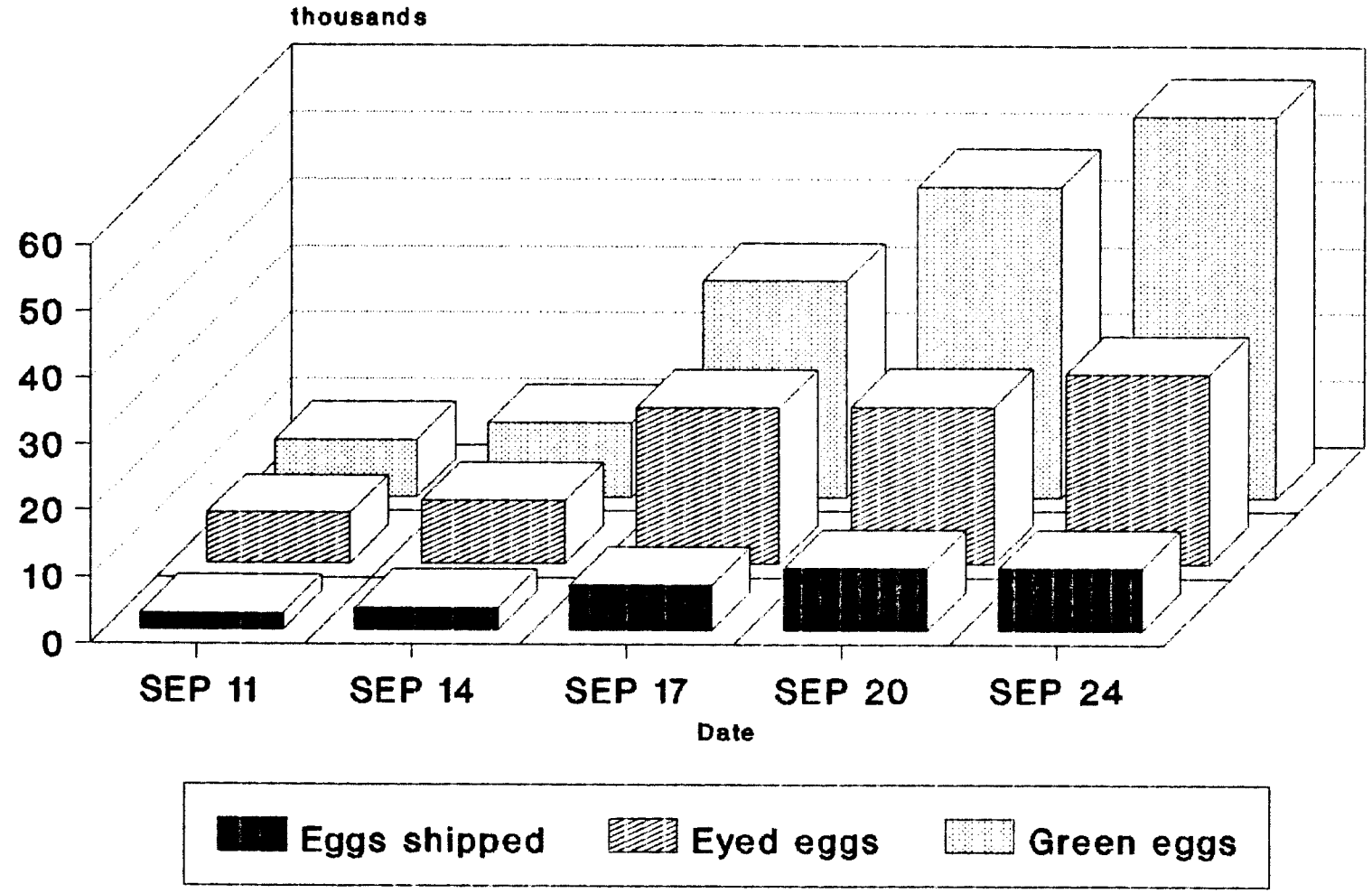

Fig. 5. Fall Chinook egg shipment, 1990

Table 5. Coeur d'Alene lake kokanee spawning summary, 1990.

Date	Number females	Average Length (mm) females	Average Length (mm) males	Green Eggs
11-13-90	112			32,480
11-20-90*	214	247	252	60,000
11-27-90	843	239	248	250,125
12-4-90	159	233	**247**	43,500
12-13-90	na			14,500
1-3-91	na			6,700
Totals				407,305

*eggs delay fertilized and heat shocked
average length=244.7; f=240.2 m=249.1

SPECIAL PROJECTS

Net Pens

The net pen program was transferred to the Sandpoint Hatchery. Continual contacts were made with Harbor Marine, (Metropolitan Mortgage and Securities, Inc.), Scenic Bay (Wally Wright), and Bitterend Marina (Dick Hansen), plus two additional contacts were made with Hudson Bay Marine (MacDonald) and Red Fir Lodge (Bob Anderson) to raise westslope cutthroat trout in 20 ft x 20 ft x 20 ft net pens. These organizations have agreed to tend the nets and feed the fish. Local groups, Trout Unlimited and Lake Pend Oreille Idaho Club, have agreed to purchase fish feed for the season. In 1990, Trout Unlimited purchased $1,200 and Lake Pend Oreille Idaho Club (LPOIC) purchased $1,503 of fish feed. In addition, LPOIC has made arrangements with Satcom, Inc. to provide shipping of fish feed from Seattle to the Sandpoint Hatchery.

Washington Water Power bought a net for the new Red Fir Lodge pen site. MacDonald purchased ($780) a net and LPOIC bought ($608) the floating frame for the Hudson Bay site.

The six pens were loaded with 60,000 (10,000/pen) one-year-old westslope cutthroat trout at an average length of 4.6 inches. Trout will be fed Bioproduct's Biodry 4000 diet, with growth projections based on water temperatures and lengths to provide growth rates between 0.25 and 0.50 inches per month. Loading rates ranged from 0.044 to 0.048 pounds per cubic foot.

Fish Marking

Sandpoint took part in marking two different groups of fish for regional management and brood stock development programs.

Bull trout released September 18, at Cabinet Gorge, were marked with a left ventral fin clip. This mark will be used to identify age classes of hatchery-produced bull trout returning to the ladder. Bull trout released in 1989, were marked with an adipose fin clip. All bull trout released at the Cabinet Gorge ladder will be marked using fin clips based on a three year rotation; adipose, left ventral, right ventral, adipose, etc.

A tagging crew was hired to mark 60,000 one-year-old Clark Fork stock westslope cutthroats for stocking into Lake Pend Oreille net pens. All fish released from the net pens have been adipose fin-clipped.

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Fish Sterilization

The Sandpoint Hatchery is experimenting with a fish sterilization program. Two stocks of fish, fall chinook and late kokanee, were used.

Chinook eggs were heat shocked on September 14, 1990. Seven thousand five hundred shocked eggs yielded 2,800 eyed eggs. Eggs were fertilized on station at 50°F and heat treated ten minutes after fertilization. Two temperature treatments were used, 83°F and 79°F. The eggs were treated in a hot water bath for 10 minutes at 83°F and 15 minutes at 79°F (Table 6). Surviving eggs were transferred to Mackay Hatchery for rearing.

Late kokanee were heat shocked November 20, 1990. Fifty-three thousand seven hundred (53,700) shocked eggs resulted in 14,880 sac-fry for a 27.7% survival rate (Table 6). Eggs were fertilized at 50°F and heat treated 10 minutes post fertilization at 83°F for 10 minutes. Eggs were incubated at the Cabinet Gorge Hatchery in heath stacks. Swim-up fry were returned to Sandpoint for rearing.

FISH HEALTH

All fish transferred to Sandpoint Hatchery were examined for specific pathogens (Table 7). Most stocks transferred were pathogen free, however no disease document verified the status of the Utah lake trout from Grace Hatchery.

Table 6. Fall chinook and late kokanee heat shocking egg survival.

Species	Date	Method	Temp.	Green Eggs	Eyed eggs	Percent
FC	9-14	10/10	83	1,940	490	25.2
FC	9-14	10/10	83	1,970	330	16.7
FC	9-14	10/15	79	1,785	975	54.6
FC	9-14	10/15	79	1,800	1,010	56.1
FC	9-14	control	50	1,750	1,340	76.5
KL	11-20	10/10	83	53,700	14,880	27.7
KL	11-20	control	50	6,300	5,700	90.5

Table 7. Fish health summary.

A. Fish transferred to Sandpoint Hatchery.

Brood year	Stock	Sample date	VH	VP	VE	BK	BF	BR	BC	PX	PW	PC
1989	9-Id-Bt	5-10-90	-	-	-	-	-	-	-	-		
1989	9F-Mon-C2	5-10-90	-	-	-	-	-	-	-	-		
1989	9-IdSS-KL	7-19-90	-	-	-	-	-	-	-	-		
brood		12-01-89	-	-	-	-					-	-
1990	0F-Mon-C2	5-23-90	-	-		-	-	-			-	
1990	0F-Ut-Lt	na										

B. Brood stock, Sandpoint Hatchery.

BY91	1-Id-Fc	9-24-90	-	-	-	-					-	
BY91	1-IdCFR-Bu	9-26-90	-	-		-						
		10-16-90	-	-		-						
	1-IdGC-Bu	9-25-90	-	-		-						
		10-16-90	-	-		-						
BY91	1-IDCdA-KL	11-27-90	-	-	-	-					-	-

\+ = positive
\- = negative
= no testing done

VH = IHNV, infectious hematopoietic necrosis virus
VP = IPNV, infectious pancreatic necrosis virus
VE = EIBS, erythrocytic inclusion body syndrone virus
BK = BKD, bacterial kidney disease agent, Renibacterium salmoninarum
BR = ERM, enteric red mouth bacterium, Yersinia ruckeri
BC = bacteria cold water disease, Cytophaga or Flexibactor
BF = bacterial furunculosis, Aerosonas salmonicida
PW = whirling disease agent, Myxobolus (Myxosoma) cerebralis
PX = proliferative kidney disease agent
PC = Ceratomyxa shasta, ceratomyxosis agent

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Appendix 1. Bull trout lengths Clark Fork River, Sandpoint 1990.

Sex	Lengths (cm) Total	Fork	Standard	Head	Ratio
F	74.5	73.5	68.0	18.5	3.68
F	65.5	64.0	60.0	16.0	3.75
F*	86.0	84.0	78.5	21.5	3.65
F	73.0	72.0	67.0	18.0	3.72
F*	52.0	50.5	46.5	13.0	3.58
F	66.5	65.0	60.5	16.0	3.78
F	68.5	67.0	63.0	17.5	3.60
F	81.5	80.5	73.5	19.5	3.77
F	60.5	58.0	53.5	14.0	3.82
F	66.5	64.0	59.5	15.0	3.97
M	88.0	86.0	79.0	22.0	3.59
M	73.0	71.0	66.0	19.0	3.47
M	78.5	76.0	70.0	22.5	3.11
M	68.0	66.0	61.0	17.5	3.49
M	87.0	84.0	77.5	23.5	3.30
M	70.0	68.0	63.0	18.5	3.41
M	76.0	74.5	70.0	20.5	3.41
M	85.0	83.0	76.0	23.5	3.23
M	86.0	84.5	76.0	22.5	3.38
M	65.5	63.0	58.5	16.0	3.66
M	73.5	71.0	64.5	19.0	3.39

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Appendix 2. Bull trout lengths Gold Creek, Sandpoint 1990.

Sex	Lengths (cm) Total	Fork	Standard	Head	**Ratio**
F	72.0	71.0	66.0	17.0	3.88
F	78.0	75.5	69.5	19.5	3.56
F	60.0	58.5	56.0	15.2	3.68
F	57.1	54.6	47.0	13.3	3.53
F	62.2	61.0	55.9	14.6	3.83
F	86.4	84.0	72.4	19.7	3.68
F	72.4	71.1	62.2	15.9	3.91
F	72.4	71.1	63.5	16.5	3.85
F	74.9	73.7	63.5	16.5	3.85
F	68.6	67.3	61.0	15.9	3.84
M	62.2	60.0	56.5	15.9	3.55
M	77.5	76.2	68.6	20.3	3.38
M	53.5	52.5	49.0	14.0	3.50
M	66.0	64.0	59.5	17.0	3.50
M	66.0	64.0	58.5	17.5	3.34
M	73.0	71.0	66.0	19.0	3.47
M	69.0	67.5	63.0	18.0	3.50
M	77.5	75.6	67.3	20.3	3.32
M	72.4	71.1	63.5	16.5	3.85
M	78.7	76.2	68.6	18.4	3.73
M	63.5	61.9	59.1	15.2	3.89
M	62.2	59.7	55.9	15.2	3.89
M	71.1	69.9	64.8	17.8	3.64

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